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**Notes:**

1. Untranslatable words are replaced with asterisks (\* \* \* \* \*).
2. Texts in the figures are not translated and shown as it is.

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## CLAIM + DETAILED DESCRIPTION

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**[Claim(s)]**

[Claim 1] The activated carbon manufacture method from the waste which is the manufacture method of activated carbon of following materials in a carbonization process and an activation process, performing waste in them, and obtaining activated carbon, and is characterized by making it supply the carbonization process of the preceding paragraph as heat source gas after burning the inflammable \* \* \* \* \* gas which occurs from an activation process.

[Claim 2] It is the manufacture method of activated carbon of following materials in a dryness process, a carbonization process, and an activation process, performing waste, and obtaining activated carbon. The activated carbon manufacture method from the waste characterized by supplying the both sides of the dryness process of the preceding paragraph or a carbonization process, and a dryness process as heat source gas after burning the inflammable \* \* \* \* \* gas which occurs from an activation process.

[Claim 3] While being manufacture equipment of the activated carbon which has the carbonization furnace which manufactures primary charcoal, and \* \* \* \* \* which \* \* \* \* \* primary charcoal manufactured at this carbonization furnace, and manufactures activated carbon and connecting a drying furnace and \* \* \* \* \* with a \* \* \* \* \* gas vent pipe Activated carbon manufacture equipment from the waste characterized by preparing the burner in this \* \* \* \* \* gas vent pipe.

[Claim 4] The drying furnace which dries the materials which consist of waste, and the carbonization furnace which manufactures primary charcoal from the materials dried with this drying furnace, While being manufacture equipment of the activated carbon which has \* \* \* \* \* which \* \* \* \* \* primary charcoal manufactured at this carbonization furnace, and manufactures activated carbon and connecting the both sides and \* \* \* \* \* of a drying furnace or a carbonization furnace, and a drying furnace with a \* \* \* \* \* gas vent pipe Activated carbon manufacture equipment from the waste characterized by preparing the burner in this \* \* \* \* \* gas vent pipe.

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**[Detailed Description of the Invention]**

[0001]

[Field of the Invention] This invention relates to the manufacture method and manufacture equipment which can manufacture activated carbon efficiently in more detail about the manufacture method of activated carbon and manufacture equipment which are used for the purpose of gas processing, water

disposal, and others, reducing fuel consumption from waste. Moreover, it is related also with environmental preservation technology applicable also as a system for countermeasures against dioxin, such as an incinerator.

[0002]

[Description of the Prior Art] About the manufacture method of the activated carbon which used waste as materials, various technology is proposed conventionally. And almost all the technology is performing \*\*\*\* processing for the primary carbide obtained by a certain method in materials off-line. Moreover, it is not based on the activated carbon manufacture system which used waste as materials, but a coconut shell charcoal or coal currently inexpensive produced locally in Japan and all over the world is supplied. It is substance that there is equipment which performs \*\*\*\* processing by making these into materials, and manufactures activated carbon, and only the manufacture method of such activated carbon is working industrially. It is because the chief aim was placed by only the point how to manufacture activated carbon was only made into the purpose in manufacture of activated carbon, and this could manufacture activated carbon inexpensive conventionally.

[0003] Therefore, the trial which leaves waste and manufactures activated carbon continuously by operation of the consistent carbonization and activation is not put in practical use conventionally, but can be said to be a new thing.

[0004] By the way, no matter it may be what waste, after supplying the heat from the outside, based on each conventional technology, the process of carbonization and activation is carried out, respectively, and if these processes are combined, the equipment which obtains activated carbon continuously can be obtained. Thus, the example of the manufacture equipment of the activated carbon which can be considered is shown in drawing 8.

[0005] The manufacture equipment of the activated carbon shown in drawing 8 examines the plant which obtains activated carbon by using 20% of moisture, and construction waste wood of about 3200kcal/kg of lower calorific value as materials. In the manufacture equipment of this activated carbon, while sending in the scrap wood supplied to the hopper 51 and supplying to the carbonization furnace 53 by 52 by a mechanism, a hot wind is sent, it portion-burns and scrap wood is carbonized. At this time, the primary carbide of 30.86 kg/h is obtained by amount of sending 164.7 kg/h of scrap wood.

[0006] After this primary carbide is crushed by a discharge feeder-cum-the crusher 54, it is sent to \*\*\*\*\* 55. And 6Nm of LPG fuel 3/h and about 30 kg/h of steam are supplied and burned to a burner 56, activation gas is manufactured, this activation gas is supplied to \*\*\*\*\* 55, and activated carbon is manufactured from primary carbide. The activated carbon of 10.8 kg/h is obtained at this time. The obtained activated carbon is sent to a storehouse 58, after being cooled with a condensator 57. Moreover, the \*\*\*\*\* gas discharged from the dry distilled gas discharged from the carbonization furnace 53 and \*\*\*\*\* 55 is discharged, after being sent to the secondary combustion machine 59 and burning.

[0007]

[Problem to be solved by the invention] In the manufacture method of activated carbon which was mentioned above, in order to obtain activated carbon, it was required to supply a lot of quantity of heat from the outside, and the operating cost was a problem greatly, considering the viewpoint of processing of industrial waste.

[0008] Furthermore, when there was no calorific value with it, \*\*\*\* of activated carbon was small and there was a problem it becomes impossible to make carry out partial combustion, and manufacture of activated carbon usually becomes impossible [ a problem ] with air. [ high moisture of materials waste,

etc. ] [ sufficient ]

[0009] This invention solves the above problem, and it aims at offering the activated carbon manufacture method and manufacture equipment from waste which enabled it to carbonize materials waste certainly and efficiently in a carbonization process while it loses the quantity of heat supplied from the outside or enabling it to reduce them.

[0010]

[Means for solving problem] By the way, as manufacture of activated carbon was mentioned above, it is carried out in order of the carbonization process and the activation process, and thermal energy consumption is generated in an activation process in the manufacturing process of the activated carbon which consists of such a process.

[0011] Process in which primary charcoal manufactured at the carbonization process is \*\*\*\*(ed) in an activation process is described by damage by fire of steam and the carbon by the oxidation reaction by CO<sub>2</sub> as shown in the following formulas (1) and (2). This reaction is an endoergic reaction, and in order to make it react, heating from the outside is needed.

$C + H_2O \rightarrow CO + H_2 + 28178 \text{ kcal/Kmol} \dots (1)$

$C + CO_2 \rightarrow 2CO + 37960 \text{ kcal/Kmol} \dots (2)$

[0012] An activation process serves as a reaction in 800-1000-degree C high temperature, and fuel is consumed by preheating of primary charcoal, \*\*\*\* up to 900 degrees C of combustion gas, etc. other than this reaction fever. On the other hand, about 70% of primary charcoal is consumed by oxidization, and it is discharged out of a furnace as combustible gas of CO and H<sub>2</sub> grade.

[0013] the activated carbon manufacture equipment shown in drawing 8 -- the amount of exhaust gas of the \*\*\*\*\* exit to kick and an example of the composition are shown below.

[0014]

\*\*\*\*\*;

Temperature 900 degrees C \*\*\*\*\* gas mass flow 241Nm<sup>3</sup>/h Average calorific value 817kcal/Nm<sup>3</sup> (low grade)

Gas composition H<sub>2</sub>:10%, CO: 18.6% Others : Steam, nitrogen, CO<sub>2</sub> [0015] The \*\*\*\*\* gas discharged from the above-mentioned \*\*\*\*\* had hypergolicity, and the quantity of heat was larger than all the calorific value of LPG consumed by \*\*\*\*\*. [ this invention ] while this invention can reduce the business quantity of heat which must be supplied from the outside by having been made based on the above-mentioned knowledge and using effectively the inflammable \*\*\*\*\* gas discharged from \*\*\*\*\* It enables it to carbonize materials waste in a carbonization process efficiently.

[0016] [ namely, the activated carbon manufacture method from the waste concerning Claim 1 ] It is the manufacture method of activated carbon of following materials in a carbonization process and an activation process, performing waste, and obtaining activated carbon, and after burning the combustible gas which occurs from an activation process, it constitutes having made it supply the carbonization process of the preceding paragraph as heat source gas as a feature.

[0017] In the activated carbon manufacture method from the waste concerning Claim 1, the \*\*\*\*\* gas which occurred at the activation process is once burned, and it is used for the heat gas which is introduced into a carbonization process in the state of \*\*\*\*\*\*, and carbonizes materials.

[0018] [ the activated carbon manufacture method from the waste concerning Claim 2 ] It is the manufacture method of activated carbon of following materials in a dryness process, a carbonization process, and an activation process, performing waste, and obtaining activated carbon, and after burning

the combustible gas which occurs from an activation process, it constitutes supplying the both sides of the dryness process of the preceding paragraph or a carbonization process, and a dryness process as heat source gas as a feature.

[0019] In the activated carbon manufacture method from the waste concerning Claim 2, the \*\*\*\*\* gas which occurred at the activation process is once burned, and it is introduced into the both sides of a dryness process or a carbonization process, and a dryness process in the state of \*\*\*\*\*, and is used for the heat gas which dries or carbonizes materials.

[0020] [ the activated carbon manufacture equipment from the waste concerning Claim 3 ] While being manufacture equipment of the activated carbon which has the carbonization furnace which manufactures primary charcoal, and \*\*\*\*\* which \*\*\*\*\* primary charcoal manufactured at this carbonization furnace, and manufactures activated carbon and connecting a drying furnace and \*\*\*\*\* with a \*\*\*\*\* gas vent pipe It constitutes as a feature that the burner is prepared in this \*\*\*\*\* gas vent pipe.

[0021] In the activated carbon manufacture equipment from the waste concerning Claim 3, although sent to a carbonization furnace through a \*\*\*\*\* gas vent pipe, when the \*\*\*\*\* gas which occurred in \*\*\*\*\* passes along a \*\*\*\*\* gas vent pipe, it burns with a burner, is supplied to a carbonization furnace in the state of \*\*\*\*\*, and is used as heat gas for carbonization of materials.

[0022] [ the activated carbon manufacture equipment from the waste concerning Claim 4 ] The drying furnace which dries the materials which consist of waste, and the carbonization furnace which manufactures primary charcoal from the materials dried with this drying furnace, While being manufacture equipment of the activated carbon which has \*\*\*\*\* which \*\*\*\*\* primary charcoal manufactured at this carbonization furnace, and manufactures activated carbon and connecting the both sides and \*\*\*\*\* of a drying furnace or a carbonization furnace, and a drying furnace with a \*\*\*\*\* gas vent pipe It constitutes as a feature that the burner is prepared in this \*\*\*\*\* gas vent pipe.

[0023] Although the \*\*\*\*\* gas which occurred in \*\*\*\*\* is sent to the both sides of a drying furnace or a carbonization furnace, and a drying furnace through a \*\*\*\*\* gas vent pipe in the activated carbon manufacture equipment from the waste concerning Claim 4 When it passes along a \*\*\*\*\* gas vent pipe, it burns with a burner, a drying furnace is supplied in the state of \*\*\*\*\*, and it is used as heat gas for dryness of materials or carbonization.

[0024] [Mode for carrying out the invention] In the activated carbon manufacture method from the waste by this invention, as long as the dry distilled gas supplied to a carbonization process or a dryness process from an activation process satisfies a quantity required for a carbonization process or a dryness process, it does not need to be the whole quantity of the \*\*\*\*\* gas which occurred at the activation process, and may be the part.

[0025] Although a drying furnace may be formed independently separately from a carbonization furnace, you may establish it in a carbonization furnace and one. For example, one rotary kiln classifies, and make the preceding paragraph into a dryer part and let the latter part be a carbonization part.

[0026] as a carbonization furnace -- furnace form, such as a rotary kiln type, a flow layer type, and a move layer type, -- moreover -- as an operating method -- both a batch type, a continuation type, etc. -- although -- it is applicable. Generally partial combustion of the carbonization is carried out by about 0.1 to 0.3 air ratio. Moreover, as for carbonization temperature, about 300-600 degrees C is used.

[0027] As \*\*\*\*\* , various form, such as a rotary kiln, flow \*\*\*\*\* , a fixed zone furnace, move \*\*\*\*\* , and a moving bed furnace, can be applied, and the both sides of the continuation furnace which performs

injection of materials and extraction of a product continuously, and the batch type furnace performed intermittently can apply. In this \*\*\*\* process, steam, air, carbon dioxide, combustion gas, etc. are used as an oxidizer. In these, \*\*\*\* by steam is considered to be the best from the performance side of the activated carbon obtained. Using the steam generated by a waste heat boiler, steam is made to generate steam using various kinds of heat generated within an incineration system, and it can use for it.

[0028]

[Working example] The 1st work example (it corresponds to Claims 1 and 3) of the activated carbon manufacture equipment from the waste by this invention is explained with reference to drawing 1, drawing 2, and drawing 3.

[0029] The figure in which drawing 1 shows the outline of activated carbon manufacture equipment, the sectional view which cut the carbonization furnace which uses drawing 2 for activated carbon manufacture equipment to the axis of a kiln and parallel, and drawing 3 are the A-A line sectional views in drawing 2.

[0030] \*\*\*\*\* of the carbonization furnace at which 1 manufactures primary charcoal from waste in drawing 1, and the flow layer type which 2 \*\*\*\* primary charcoal sent from the carbonization part 1, and manufactures activated carbon, The secondary combustion machine which burns the dry distilled gas with which 3 was discharged from the carbonization furnace 1, the condensator which cools the activated carbon with which 4 was manufactured by \*\*\*\*\* 2, the storehouse in which 5 stores the activated carbon cooled with the condensator 4, and 6 are burners which manufacture the \*\*\*\* gas supplied to \*\*\*\*\* 2. The upper end [ of \*\*\*\*\* 2 ] and air supply side of the carbonization furnace 1 is connected with the \*\*\*\*\* gas vent pipe 7, and the burner 8 and the condensator 9 are formed in this \*\*\*\*\* gas vent pipe 7 from the \*\*\*\*\* 2 side. Moreover, the carbonization furnace 1 and \*\*\*\*\* 2 are connected through a feeder-cum-the crusher 10, and have come to be able to carry out direct supply of the primary charcoal from the carbonization furnace 1 at \*\*\*\*\* 2.

[0031] As said carbonization furnace 1 is shown in drawing 2 and drawing 3, it becomes the breathability partial combustion carbonization part 12 in which the vent whose abbreviation halves by the side of the entrance of the rotary kiln 11 are a large number was formed, and the outlet side serves as the stay part 13 in which the vent is not formed. Panels 14 and 14 are formed in the both ends of the rotary kiln 11, and the rotary kiln 11 slides with these panels 14 and 14, and is supported free [ rotation ]. Moreover, the gear 15 is formed in the rotary kiln 11 at the perimeter, this gear 15 is connected with the motor 17 through the gear 16, and the rotary kiln 11 rotates in the fixed direction by the drive of a motor 17.

[0032] [ the perimeter of the breathability partial combustion carbonization part 12 of the rotary kiln 11 ] The cylindrical outside trunk 18 is formed with some gaps, the style box 19 for air supply for sending in air or combustion gas in the rotary kiln 11 is formed in the undersurface side of the outside [ this ] trunk 18, and the air supply opening 20 to which air etc. is sent is formed in this style box 19 for air supply. Moreover, while the exhaust port 21 which exhausts dry distilled gas is formed in the outlet side of the rotary kiln 11 and said \*\*\*\*\* gas vent pipe 9 is connected with this exhaust port 21, it connects with the secondary combustion machine 3.

[0033] Moreover, while the screw 22 which transports materials by rotation of the rotary kiln 11 is formed in the inside of the rotary kiln 11, the sending mechanism 24 for sending in a hopper 23 and materials is formed in the entrance side (left-hand side in a figure) of the rotary kiln 11.

[0034] In order to manufacture activated carbon with the above activated carbon manufacture equipment, after making the waste wood 25 as materials an about 20-30mm chip, it sends in from a hopper 23 and supplies continuously in the rotary kiln 11 according to a mechanism 24. Although the thrown-in waste wood 25 is conveyed by the outlet side on a screw 22 with rotation of the rotary kiln 11, in the breathability partial combustion carbonization part 12, the combustion gas which burned the \*\*\*\*\* gas which passes along with an air supply opening 20 and the style box 19 for air supply, and which is mentioned later is introduced. Carry out ventilation of the waste wood 25, carry out partial combustion and it is made to carbonize, and further, the introduced combustion gas promotes carbonization of waste wood 25 through the stay part 13, and is sent to the secondary combustion machine 3 from an exhaust port 21 after that. In this way, the obtained primary charcoal is sent to \*\*\*\*\* 2, after having been crushed by about several millimeters by a discharge feeder-cum-the crusher 10. At this time, the primary charcoal of 35.3 kg/h was obtained to amount of waste wood introduction 164.7 kg/h on conditions with carbonization furnace 1 temperature of 450 degrees C. This quantity is a value high about 15% as compared with the case of the activated carbon manufacture equipment shown in drawing 8 which does not reuse \*\*\*\*\* gas.

[0035] In \*\*\*\*\* 2, after LPG is introduced into a burner 6 and burns by 6.91Nm<sup>3</sup>/h, \*\*\*\*\* 2 is supplied with steam and air, and primary charcoal sent from the carbonization furnace 1 is \*\*\*\*\* (ed). Although this fuel consumption is 15% higher than the case of the activated carbon manufacture equipment shown in drawing 8, the activated carbon obtained is increasing 15% with 12.34 kg/h. At this time, calorific value is 1015kcal/Nm<sup>3</sup>, and self-\*\* is possible for the inflammable \*\*\*\*\* gas which occurred in \*\*\*\*\* 2. After this \*\*\*\*\* gas is cooled to the temperature which can be supplied to the carbonization furnace 1 with a condensator 9 after being sent to a burner 8 and burning, it is introduced in the rotary kiln 11 through an air supply opening 20 and the style box 19 for air supply. Oxygen concentration is 2%, when combustion of said \*\*\*\*\* gas considers it as an air ratio 1.24 and the carbonization furnace 1 is supplied as a result. Moreover, the temperature of the gas introduced into the rotary kiln 11 was about 900 degrees C. On such an operating condition, the whole quantity of the \*\*\*\*\* gas which occurred in \*\*\*\*\* 2 was able to be supplied to the carbonization furnace 1.

[0036] As mentioned above, comprehensive \*\*\*\* of activated carbon was able to be raised about 15% by burning the \*\*\*\*\* gas which occurred in \*\*\*\*\* 2, and making it circulate as the heat source of the carbonization furnace 1, and air for partial combustion.

[0037] The 2nd work example (it corresponds to Claims 2 and 4) of the activated carbon manufacture equipment from the waste by this invention is explained with reference to drawing 4, drawing 5, drawing 6, and drawing 7.

[0038] The B-B line sectional view in drawing 5 and drawing 7 of the figure in which drawing 4 shows the outline of activated carbon manufacture equipment, the sectional view which cut the carbonization furnace which uses drawing 5 for activated carbon manufacture equipment to a kiln and parallel, and drawing 6 are the C-C line sectional views in drawing 5.

[0039] The 2nd work example is a thing using the dryness carbonization furnace which prepared the dryer part in the preceding paragraph of the carbonization part which is made to carry out partial combustion and is carbonized, and other composition is the same as that of the 1st work example. That is, \*\*\*\*\* 2 other than dryness carbonization furnace 30, the secondary combustion machine 3, a condensator 4, a storehouse 5, a burner 6, the \*\*\*\*\* gas vent pipe 7, the burner 8, the condensator 9,

and a discharge feeder-cum-the crusher 10 are constituted like the 1st work example and abbreviation. [0040] As the dryness carbonization furnace 30 is shown in [drawing 5](#), [drawing 6](#), and [drawing 7](#), the rotary kiln 31 is classified into three. The stay part 34 in which the breathability dryer part 32 in which many vents were formed, the breathability partial combustion carbonization part 33 in which many vents were formed, and the vent are not formed from the preceding paragraph side is formed. Panels 35 and 35 are formed in the both ends of the rotary kiln 31, and the rotary kiln 31 slides with these panels 35 and 35, and is supported free [ rotation ]. Moreover, the gear 36 is formed in the rotary kiln 31 at the perimeter, this gear 36 is connected with the motor 38 through the gear 37, and the rotary kiln 31 rotates in the fixed direction by the drive of a motor 38.

[0041] The cylindrical outside trunk 39 is formed in the perimeter of the breathability dryer part 32 with some gaps, the style box 40 for air supply is formed in the undersurface side of the outside [ this ] trunk 39, and the air supply opening 41 to which combustion gas is sent is further formed in this style box 40 for air supply. And this air supply opening 41 is connected with said \*\*\*\*\* gas vent pipe 7, and after burning the \*\*\*\*\* gas which occurred in \*\*\*\*\* 2, it can be introduced in the rotary kiln 31. Moreover, the style box 42 for exhaust air is formed in the upper surface side of a trunk 39 outside the breathability dryer part 32, and an exhaust port 47 is formed in this style box 42 for exhaust air, and this exhaust port 47 is connected with said secondary combustion machine 3.

[0042] The cylindrical outside trunk 44 is formed also in the perimeter of the breathability partial combustion carbonization part 33 with some gaps, the style box 45 for air supply is formed in the undersurface side of the outside [ this ] trunk 44, and the air supply opening 46 for sending in air etc. in the rotary kiln 31 is formed in this style box 45 for air supply. Moreover, the exhaust port 46 which exhausts dry distilled gas is formed in the outlet side of the rotary kiln 31, and this exhaust port 47 is connected with the secondary combustion machine 3.

[0043] Moreover, while the screw 48 which transports materials by rotation of the rotary kiln 31 is formed in the inside of the rotary kiln 31, the sending mechanism 50 for sending in a hopper 49 and materials is formed in the entrance side (left-hand side in a figure) of the rotary kiln 31.

[0044] In order to manufacture activated carbon with the above activated carbon manufacture equipment, after making the waste wood 25 as materials an about 20-30mm chip, it sends in from a hopper 49 and supplies continuously in the rotary kiln 31 according to a mechanism 50. Although the thrown-in waste wood 25 is conveyed by the outlet side on a screw 48 with rotation of the rotary kiln 31, in the breathability dryer part 32, the combustion gas which burned the \*\*\*\*\* gas which passes along with an air supply opening 41 and the style box 40 for air supply, and which is mentioned later is introduced. The introduced combustion gas carries out ventilation of the waste wood 25, dries it, and is sent to the secondary combustion machine 3 from an exhaust port 47 after that. At this time, the combustion gas introduced is a low value whose oxygen concentration is about 2%, and waste wood carries out partial ignition by the breathability dryer part 32.

[0045] the fresh air which waste wood 25 was sent to the breathability partial combustion carbonization part 33 from the breathability dryer part 32, and has been sent from the air supply opening 46 in the breathability partial combustion carbonization part 33 -- about 20% -- it is carbonized while carrying out partial combustion, and further, it is sent to the stay part 34 and carbonization is promoted.

[0046] In this way, the obtained primary charcoal is sent to \*\*\*\*\* 2, after having been crushed by about several millimeters by a discharge feeder-cum-the crusher 10. At this time, the primary charcoal of 30.86 kg/h was obtained on conditions with carbonization furnace 30 temperature of 450 degrees C.

[0047] In \*\*\*\*\* 2, after LPG is introduced into a burner 6 and burns by 6.05Nm<sup>3</sup>/h, \*\*\*\*\* 2 is supplied with steam and air, and primary charcoal sent from the dryness carbonization furnace 30 is \*\*\*\*\* (ed). At this time, calorific value is 1015kcal/Nm<sup>3</sup>, and self-\*\*\* is possible for the inflammable \*\*\*\*\* gas which occurred in \*\*\*\*\* 2. After this \*\*\*\*\* gas is cooled to the temperature which can be supplied to the breathability dryer part 32 of the carbonization furnace 30 with a condensator 9 after being sent to a burner 8 and burning, it is introduced in the rotary kiln 31 through an air supply opening 41 and the style box 40 for air supply. Oxygen concentration is 2%, when combustion of said \*\*\*\*\* gas considers it as an air ratio 1.24 and a carbonization furnace is supplied as a result. Moreover, the temperature of the gas introduced into the rotary kiln 31 was about 900 degrees C. On such an operating condition, the whole quantity of the \*\*\*\*\* gas which occurred in \*\*\*\*\* 2 was able to be supplied to the carbonization furnace 30.

[0048] In this work example, if the case where the activated carbon manufacture equipment shown in drawing 8 and an equivalent amount of activated carbon are obtained is assumed, as \*\*\*\*\* , about the same materials as material wood will be mostly made as for moisture content to direct activated carbon with 47%. That amount of injections is 20% of moisture, and 164.7kg at the exit of 248 kg/h and the breathability dryer part 32, and the materials quality in this portion has been the same conditions as the materials (20% of moisture, 164.7 kg/h) in the 1st work example.

[0049] In this work example, when the calorie of the combustible gas in a \*\*\*\*\* exit is effectively used for dehumidification of moisture of raw material 100% supposing the case of being ideal, the amount of initial moisture of waste wood can be permitted to about 67%. In this case, the amount of injections is 403kg/h.

[0050] As mentioned above, without carrying out the additional injection of thermal energy by burning the \*\*\*\*\* gas which contains a combustible gas ingredient so much, introducing into the drying furnace of materials established in the preceding paragraph of carbonization, and dehumidifying raw material, even if it is the raw material of high moisture content, activated carbon can be manufactured efficiently.

[0051] Moreover, an indirect heat exchanger can be used as a condensator. Moreover, although steam and other inactive gas can be introduced and it can also cool, since ignition of materials will start if oxygen increases, cooling by mixture of air is not desirable.

[0052]  
[Effect of the Invention] With the above structures, this invention has the effect taken below.

(1) By burning the \*\*\*\*\* gas which occurred in \*\*\*\*\* by a low-altitude mind ratio, and introducing into a carbonization furnace, it can be considered as the heat source of dry distilled gas. This heat provided by partial combustion until now will be supplied by \*\*\*\*\* gas, a necessary partial burning rate falls, and \*\*\*\*\* of the activated carbon obtained from the amount of the same materials as a result increases.

(2) Since a drying furnace is established in the preceding paragraph of a carbonization furnace, the flue gas of \*\*\*\*\* gas is introduced into a drying furnace and dehumidification of injection materials is performed, as injection materials, it is expandable to about a maximum of 67% of moisture. As a result, the materials for activated carbon manufacture are expanded sharply, and activated carbon can be manufactured by using material wood, a kitchen garbage, etc. as materials.



## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] It is the schematic view of the 1st work example of the activated carbon manufacture equipment from the waste by this invention.

[Drawing 2] It is the sectional view which cut the carbonization furnace used for the 1st work example of the activated carbon manufacture equipment from the waste by this invention in parallel with the axis line of a rotary kiln.

[Drawing 3] It is an A-A line sectional view in drawing 2.

[Drawing 4] It is the schematic view of the 2nd work example of the activated carbon manufacture equipment from the waste by this invention.

[Drawing 5] It is the sectional view which cut other examples of the carbonization furnace which can be used for activated carbon manufacture equipment from the waste by this invention in parallel with \*\*\*\* of a rotary kiln.

[Drawing 6] It is a B-B line sectional view in drawing 5.

[Drawing 7] It is a B-B line sectional view in drawing 5.

[Drawing 8] It is the schematic view of the activated carbon manufacture equipment which can be considered from the conventional technology.

### [Explanations of letters or numerals]

1 -- Carbonization furnace

2 -- \*\*\*\*\*

3 -- Secondary combustion machine

4 -- Condensator

5 -- Storehouse

6 -- Burner

7 -- Steam ejector

8 -- A discharge feeder-cum-crusher

9 -- \*\*\*\*\* gas vent pipe

10 -- A discharge feeder-cum-crusher

11 -- Rotary kiln

12 -- Breathability partial combustion carbonization part

13 -- Stay part

30 -- Carbonization furnace

31 -- Rotary kiln

32 -- Breathability dryer part

33 -- Breathability partial combustion carbonization part

34 -- Stay part

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[Translation done.]